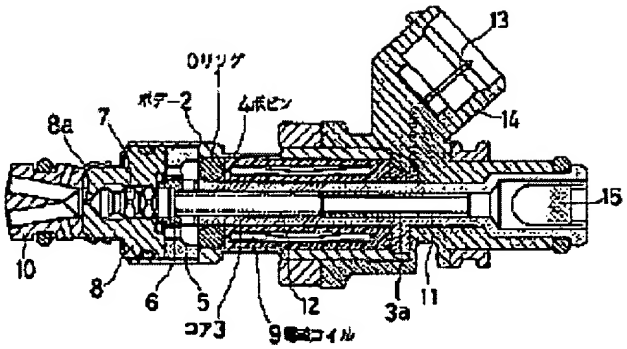
ELECTRONIC MAGNET FUEL INJECTION VALVE

Patent number: JP6229348
Publication date: 1994-08-16
Inventor: MAKIMURA TOSHIRO; others: 01
Applicant: AISAN IND CO LTD
Classification:
- international: F02M51/06; F02M61/16
- european:
Application number: JP19930037564 19930201
Priority number(s):

Abstract of **JP6229348**

PURPOSE:To prevent or reduce deterioration in fuel seal duel to use in high- temperature atmosphere.
CONSTITUTION:A synthetic-resin bobbin 4 wound with an electromagnetic coil 9 is disposed in a cylindrical metallic body 2. A metallic core, cylindrical and hollow, as a fuel path through the middle, is disposed within the bobbin 4. A single O-ring seals in between the body 2 and the core 3, without disposing an O-ring between the body 2 and the bobbin 4 and between the bobbin 4 and the core 3.



JAPANESE [JP,06-229348,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE INVENTION TECHNICAL PROBLEM MEANS OPERATION EXAMPLE DESCRIPTION OF DRAWINGS DRAWINGS

[Translation done.]

*NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] the inside of the metal body which carried out tubed -- electromagnetism -- the electromagnetic fuel injection valve to which the seal of between said bodies and cores is carried out with one O ring in tubed in nothing and the condition that the metal core which makes the centrum a fuel path does not arrange an O ring separately in the electromagnetic fuel injection valve arranged in said bobbin between said bodies and bobbins and between the bobbin and said core while the bobbin made of synthetic resin which looped around the coil is arranged.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the electromagnetic fuel injection valve mainly used for the electronic formula fuel injection equipment of an automobile engine.
[0002]
[Description of the Prior Art] The conventional example of an electromagnetic fuel injection valve is described with reference to drawing 2 which showed the sectional view. the inside of the metal body 20 with which the electromagnetic fuel injection valve carried out tubed -- electromagnetism -- while the bobbin 40 made of synthetic resin which looped around the coil 90 is arranged, nothing and metal Core 30 which makes the centrum a fuel path are arranged in said bobbin 40 in tubed. And said body 20 and bobbin 40, and in between, O ring 101,102 is usually separately arranged again so that the fuel which passes along a fuel path between a bobbin 40 and Core 30 may not leak out of the body. The electromagnetic fuel injection valve with such seal structure is indicated by for example, the JP,3-15654,A official report or the JP,58-131353,A official report.
[0003]
[Problem(s) to be Solved by the Invention] Since one side of the member which the internal and external sealing surface contacts [according to the conventional electromagnetic fuel injection valve] in any O ring 101,102 is the bobbin 40 made of synthetic resin, if used in the elevated-temperature ambient atmosphere by engine heat, the deformation by the thermal expansion of the bobbin 40 made of synthetic resin may become large, and the fuel seal nature of O ring 101,102 may get worse.
[0004] Then, it is made in order that this invention may solve the above mentioned trouble, and the purpose is in offering the electromagnetic fuel injection valve which can prevent or reduce aggravation of the fuel seal nature by using it in an elevated-temperature ambient atmosphere.
[0005]
[Means for Solving the Problem] the inside of the metal body with which this invention which solves said technical problem carried out tubed -- electromagnetism, while the bobbin made of synthetic resin which looped around the coil is arranged It sets tubed to nothing and the electromagnetic fuel injection valve by which the metal core which makes the centrum a fuel path is arranged in said bobbin. The seal of between said bodies and cores is separately carried out with one O ring in the condition of not arranging an O ring, between said bodies and bobbins and between the bobbin and said core.
[0006]
[Function] According to said means, since the internal and external sealing surface of an O ring all contacts a metal member with the small deformation by thermal expansion compared with synthetic resin, even if it uses it in an elevated-temperature ambient atmosphere, the fuel seal nature of an O ring is hard to be spoiled.
[0007]
[Example] One example of this invention is explained according to a drawing. The electromagnetic fuel injection valve of this example is shown to drawing 1 by the sectional view. The outline of an electromagnetic fuel injection valve is described first. The bulb housing 8 is supported through the spacer 5 by the point (illustration left end section) of the body 2 which carried out tubed [which has magnetism / made from a metal (for example, electromagnetism stainless steel)]. The bulb housing 8 has nozzle hole 8a in the point. In addition, the adapter 10 is attached in the point of the bulb housing 8.
[0008] In said bulb housing 8, the bulb 7 is held possible [sliding]. The armature 6 is attached in the back end section of this bulb 7. the electromagnetism which drives said bulb 7 in said body 2 -- the bobbin 4 made of synthetic resin

which looped around the coil 9 is arranged.

[0009] In said bobbin 4, the core 3 which carried out tubed [which has magnetism / made from a metal (for example electromagnetism stainless steel)] is arranged. The point of this core 3 is in the same field as the abutment of said spacer 5 of said body 2, and flange 3a of a center section is combined with the back end section of said body 2. This core 3 makes that centrum a fuel path, and piping for supplying a fuel is connected to that back end section. In addition, the filter 15 is formed in the core 3.

[0010] said core 3 and the back end section of said body 2 -- said electromagnetism -- the connector 14 made of synthetic resin equipped with the terminal 13 of a coil 9 is fabricated in one. Between said bulbs 7 and fixed sleeves 11 in said core 3, the spring 12 which a bulb 7 is energized [spring] in the direction of clausilium, and sits the sheet section of the bulb housing 8 intervenes.

[0011] said electromagnetic fuel injection valve -- setting -- electromagnetism -- said bulb 7 is made to carry out a lift, and is made to open, when magnetic attraction of the armature 6 of the back end of a bulb 7 is resisted and carried out to energization of a spring 12 by the energization to a coil 9 until the back end side of said armature 6 contacts the point of said core 3 said electromagnetism -- if the energization to a coil 9 is intercepted, energization of a spring 12 will carry out clausilium of the bulb 7 again.

[0012] Next, important section structure is explained in full detail. Between said bodies 2 and cores 3, O ring 1 located between said bobbins 4 and spacers 5 is arranged. Each of that internal and external sealing surface has elasticity in the peripheral surface concerned of the body 2 and a core 3, and touches, and the seal of this O ring 1 is carried out so that a fuel may not leak out of the body. There is this one O ring 1 and it has achieved the seal function almost equivalent to the former (refer to drawing 2) separately arranged between the body 2 and a bobbin 4 and between that bobbin 4 and said core 3.

[0013] Since the internal and external sealing surface of O ring 1 all contacts the body 2 or the core 3 which is metal components with the small deformation by thermal expansion compared with synthetic resin according to said electromagnetic fuel injection valve, even if it uses it in an elevated-temperature ambient atmosphere, the fuel seal nature of O ring 1 is hard to be spoiled.

[0014]

[Effect of the Invention] According to this invention, when the internal and external sealing surface of an O ring is all in contact with the metal body and the core with small deformation by thermal expansion compared with synthetic resin, aggravation of the fuel seal nature of the O ring by using it in an elevated-temperature ambient atmosphere can be prevented or reduced. Moreover, since the seal function that the O ring which was conventionally required for two pieces is equivalent to it at one piece is obtained, formation of small lightweight and low cost-ization can be attained.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

TECHNICAL FIELD

[Industrial Application] This invention relates to the electromagnetic fuel injection valve mainly used for the electronic formula fuel injection equipment of an automobile engine.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

PRIOR ART

[Description of the Prior Art] The conventional example of an electromagnetic fuel injection valve is described with reference to drawing 2 which showed the sectional view. the inside of the metal body 20 with which the electromagnetic fuel injection valve carried out tubed -- electromagnetism -- while the bobbin 40 made of synthetic resin which looped around the coil 90 is arranged, nothing and metal Core 30 which makes the centrum a fuel path are arranged in said bobbin 40 in tubed. And said body 20 and bobbin 40, and in between, O ring 101,102 is usually separately arranged again so that the fuel which passes along a fuel path between a bobbin 40 and Core 30 may not leak out of the body. The electromagnetic fuel injection valve with such seal structure is indicated by for example, the JP,3-15654,A official report or the JP,58-131353,A official report.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

EFFECT OF THE INVENTION

[Effect of the Invention] According to this invention, when the internal and external sealing surface of an O ring is all in contact with the metal body and the core with small deformation by thermal expansion compared with synthetic resin, aggravation of the fuel seal nature of the O ring by using it in an elevated-temperature ambient atmosphere can be prevented or reduced. Moreover, since the seal function that the O ring which was conventionally required for two pieces is equivalent to it at one piece is obtained, formation of small lightweight and low cost-ization can be attained.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] Since one side of the member which the internal and external sealing surface contacts [according to the conventional electromagnetic fuel injection valve] in any O ring 101,102 is the bobbin 40 made of synthetic resin, if used in the elevated-temperature ambient atmosphere by engine heat, the deformation by the thermal expansion of the bobbin 40 made of synthetic resin may become large, and the fuel seal nature of O ring 101,102 may get worse.
[0004] Then, it is made in order that this invention may solve the above mentioned trouble, and the purpose is in offering the electromagnetic fuel injection valve which can prevent or reduce aggravation of the fuel seal nature by using it in an elevated-temperature ambient atmosphere.

[Translation done.]

*NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

MEANS

[Means for Solving the Problem] the inside of the metal body with which this invention which solves said technical problem carried out tubed -- electromagnetism, while the bobbin made of synthetic resin which looped around the coil is arranged It sets tubed to nothing and the electromagnetic fuel injection valve by which the metal core which makes the centrum a fuel path is arranged in said bobbin. The seal of between said bodies and cores is separately carried out with one O ring in the condition of not arranging an O ring, between said bodies and bobbins and between the bobbin and said core.
[0006]

[Translation done.]

*`NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

OPERATION

[Function] According to said means, since the internal and external sealing surface of an O ring all contacts a metal member with the small deformation by thermal expansion compared with synthetic resin, even if it uses it in an elevated-temperature ambient atmosphere, the fuel seal nature of an O ring is hard to be spoiled.

[Translation done.]

*NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

EXAMPLE

[Example] One example of this invention is explained according to a drawing. The electromagnetic fuel injection valve of this example is shown to drawing 1 by the sectional view. The outline of an electromagnetic fuel injection valve is described first. The bulb housing 8 is supported through the spacer 5 by the point (illustration left end section) of the body 2 which carried out tubed [which has magnetism / made from a metal (for example, electromagnetism stainless steel)]. The bulb housing 8 has nozzle hole 8a in the point. In addition, the adapter 10 is attached in the point of the bulb housing 8.
[0008] In said bulb housing 8, the bulb 7 is held possible [sliding]. The armature 6 is attached in the back end section of this bulb 7. the electromagnetism which drives said bulb 7 in said body 2 -- the bobbin 4 made of synthetic resin which looped around the coil 9 is arranged.
[0009] In said bobbin 4, the core 3 which carried out tubed [which has magnetism / made from a metal (for example electromagnetism stainless steel)] is arranged. The point of this core 3 is in the same field as the abutment of said spacer 5 of said body 2, and flange 3a of a center section is combined with the back end section of said body 2. This core 3 makes that centrum a fuel path, and piping for supplying a fuel is connected to that back end section. In addition, the filter 15 is formed in the core 3.
[0010] said core 3 and the back end section of said body 2 -- said electromagnetism -- the connector 14 made of synthetic resin equipped with the terminal 13 of a coil 9 is fabricated in one. Between said bulbs 7 and fixed sleeves 11 in said core 3, the spring 12 which a bulb 7 is energized [spring] in the direction of clausilium, and sits the sheet section of the bulb housing 8 intervenes.
[0011] said electromagnetic fuel injection valve -- setting -- electromagnetism -- said bulb 7 is made to carry out a lift, and is made to open, when magnetic attraction of the armature 6 of the back end of a bulb 7 is resisted and carried out to energization of a spring 12 by the energization to a coil 9 until the back end side of said armature 6 contacts the point of said core 3 said electromagnetism -- if the energization to a coil 9 is intercepted, energization of a spring 12 will carry out clausilium of the bulb 7 again.
[0012] Next, important section structure is explained in full detail. Between said bodies 2 and cores 3, O ring 1 located between said bobbins 4 and spacers 5 is arranged. Each of that internal and external sealing surface has elasticity in the peripheral surface concerned of the body 2 and a core 3, and touches, and the seal of this O ring 1 is carried out so that a fuel may not leak out of the body. There is this one O ring 1 and it has achieved the seal function almost equivalent to the former (refer to drawing 2) separately arranged between the body 2 and a bobbin 4 and between that bobbin 4 and said core 3.
[0013] Since the internal and external sealing surface of O ring 1 all contacts the body 2 or the core 3 which is metal components with the small deformation by thermal expansion compared with synthetic resin according to said electromagnetic fuel injection valve, even if it uses it in an elevated-temperature ambient atmosphere, the fuel seal nature of O ring 1 is hard to be spoiled.

[Translation done.]

*NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the sectional view showing the electromagnetic fuel injection valve of an example.
[Drawing 2] It is the sectional view showing the conventional example.
[Description of Notations]
1 O Ring
2 Body
3 Core
4 Bobbin
9 Electromagnetism -- Coil

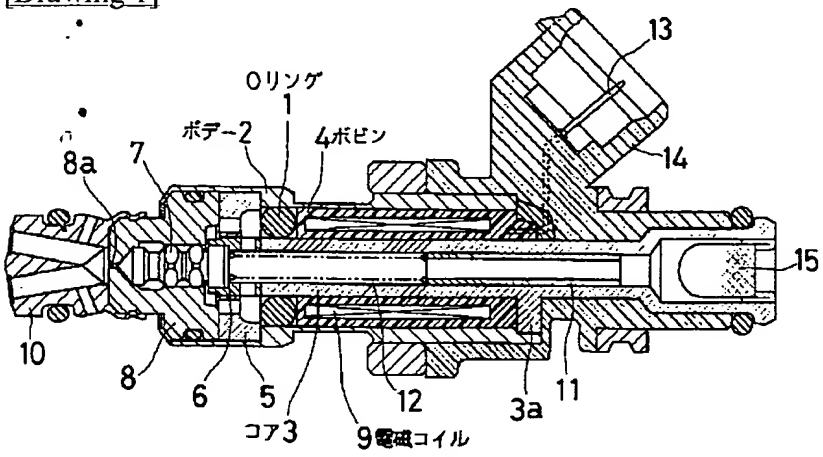
[Translation done.]

*NOTICES *

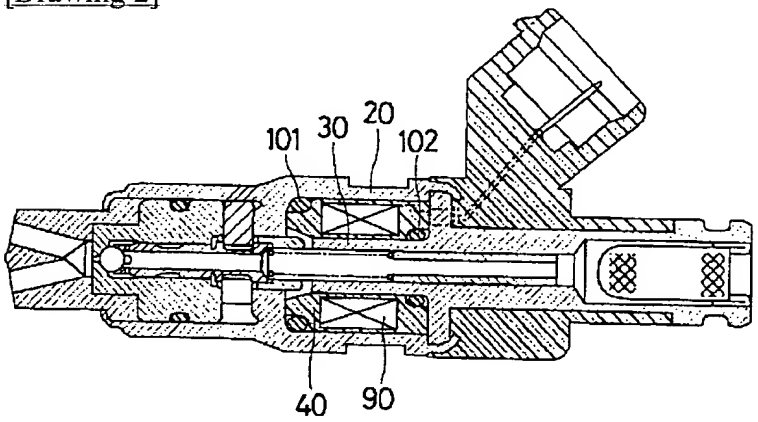
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

[Drawing 1]



[Drawing 2]



[Translation done.]

(19)日本国特許庁（ＪＰ）　(12)公開特許公報（Ａ）　(11)特許出願公開番号

特開平6－229348

(43)公開日　平成6年(1994)8月16日

(51)Int.Cl.[5]	識別記号	庁内整理番号	ＦＩ	技術表示箇所
Ｆ０２Ｍ　51/06		Ｔ　9248－3Ｇ		
61/16		Ｋ　9248－3Ｇ		

審査請求　未請求　請求項の数１　ＦＤ　（全　3　頁）

(21)出願番号　特願平5－37564

(22)出願日　平成5年(1993)2月1日

(71)出願人　000116574
愛三工業株式会社
愛知県大府市共和町一丁目１番地の１

(72)発明者　牧村　敏朗
愛知県大府市共和町一丁目１番地の１　愛三工業株式会社内

(72)発明者　平田　稔男
愛知県大府市共和町一丁目１番地の１　愛三工業株式会社内

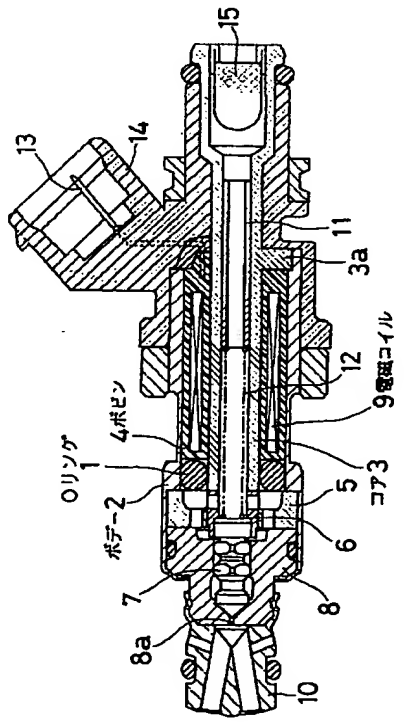
(74)代理人　弁理士　岡田　英彦　（外２名）

(54)【発明の名称】　電磁式燃料噴射弁

(57)【要約】

【目的】　高温雰囲気中で使用することによる燃料シール性の悪化を防止あるいは低減する。

【構成】　筒状をした金属製ボデー２内に電磁コイル９を巻装した合成樹脂製ボビン４が配置されるとともに、筒状をなしかつその中空部を燃料通路とする金属製コア３が前記ボビン４内に配置される。ボデー２とボビン４との間及びそのボビン４と前記コア３との間に個々にＯリング１を配置しない状態で前記ボデー２とコア３との間が１個のＯリング１でシールされる。



1

【特許請求の範囲】

【請求項1】　筒状をした金属製ボデー内に電磁コイルを巻装した合成樹脂製ボビンが配置されるとともに、筒状をなしかつその中空部を燃料通路とする金属製コアが前記ボビン内に配置される電磁式燃料噴射弁において、前記ボデーとボビンとの間及びそのボビンと前記コアとの間に個々にOリングを配置しない状態で前記ボデーとコアとの間が1個のOリングでシールされている電磁式燃料噴射弁。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、主に自動車用内燃機関の電子式燃料噴射装置に使用される電磁式燃料噴射弁に関する。

【0002】

【従来の技術】電磁式燃料噴射弁の従来例についてその断面図を示した図2を参照して述べる。電磁式燃料噴射弁は、筒状をした金属製ボデー20内に電磁コイル90を巻装した合成樹脂製ボビン40が配置されているとともに、筒状をなしかつその中空部を燃料通路とする金属製コア30が前記ボビン40内に配置されている。そして前記ボデー20とボビン40と間またボビン40とコア30との間には、燃料通路を通る燃料がボデー外へ洩れないように、通常、個々にOリング101，102が配置されている。このようなシール構造をもつ電磁式燃料噴射弁は、例えば特開平3－15654公報あるいは特開昭58－131353公報に開示されている。

【0003】

【発明が解決しようとする課題】従来の電磁式燃料噴射弁によると、いずれのOリング101，102もその内外のシール面が当接する部材の一方が合成樹脂製ボビン40であるため、エンジン熱による高温雰囲気中で使用されると、その合成樹脂製ボビン40の熱膨張による変形量が大きくなりOリング101，102の燃料シール性が悪化する場合がある。

【0004】そこで本発明は、前記した問題点を解決するためになされたものであり、その目的は高温雰囲気中で使用することによる燃料シール性の悪化を防止あるいは低減することのできる電磁式燃料噴射弁を提供することにある。

【0005】

【課題を解決するための手段】前記課題を解決する本発明は、筒状をした金属製ボデー内に電磁コイルを巻装した合成樹脂製ボビンが配置されるとともに、筒状をなしかつその中空部を燃料通路とする金属製コアが前記ボビン内に配置される電磁式燃料噴射弁において、前記ボデーとボビンとの間及びそのボビンと前記コアとの間に個々にOリングを配置しない状態で前記ボデーとコアとの間が1個のOリングでシールされている。

【0006】

2

【作用】前記手段によれば、Oリングの内外のシール面はいずれも合成樹脂に比べて熱膨張による変形量が小さい金属製部材と当接するため、高温雰囲気中で使用してもOリングの燃料シール性が損なわれにくい。

【0007】

【実施例】本発明の一実施例を図面にしたがって説明する。本例の電磁式燃料噴射弁が図1に断面図で示されている。まず電磁式燃料噴射弁の概要を述べる。磁性を有する金属（例えば電磁ステンレス）製の筒状をしたボデー2の先端部（図示左端部）には、バルブハウジング8がスペーサ5を介して支持されている。バルブハウジング8はその先端部に噴孔8aを有している。なおバルブハウジング8の先端部にはアダプタ10が取り付けられている。

【0008】前記バルブハウジング8内にはバルブ7が摺動可能に保持されている。このバルブ7の後端部には、アーマチュア6が取り付けられている。前記ボデー2内には、前記バルブ7を駆動する電磁コイル9を巻装した合成樹脂製ボビン4が配置されている。

【0009】前記ボビン4内には、磁性を有する金属（例えば電磁ステンレス）製の筒状をしたコア3が配置されている。このコア3の先端部は前記ボデー2の前記スペーサ5の受面と同一面にあり、また中央部のフランジ部3aは前記ボデー2の後端部と結合されている。このコア3はその中空部を燃料通路とするもので、その後端部には燃料を供給するための配管が接続される。なおコア3内にはフイルタ15が設けられている。

【0010】前記コア3及び前記ボデー2の後端部には、前記電磁コイル9のターミナル13を備える合成樹脂製コネクタ14が一体的に成形されている。前記バルブ7と前記コア3内の固定スリーブ11との間には、バルブ7を閉弁方向に付勢してバルブハウジング8のシート部に着座させるスプリング12が介在されている。

【0011】前記電磁式燃料噴射弁において、電磁コイル9への通電によってバルブ7の後端のアーマチュア6がスプリング12の付勢に抗して磁気吸引されることにより、前記アーマチュア6の後端面が前記コア3の先端部に当接するまで前記バルブ7がリフトさせられて開弁させられる。前記電磁コイル9への通電が遮断されると、再びバルブ7はスプリング12の付勢によって閉弁させられる。

【0012】次に要部構造について詳述する。前記ボデー2とコア3との間には、前記ボビン4とスペーサ5との間に位置するOリング1が配置されている。このOリング1は、その内外の各シール面がボデー2及びコア3の当該周面に弾性をもって接触しており、ボデー外へ燃料が洩れないようにシールしている。このOリング1は1個で、ボデー2とボビン4との間及びそのボビン4と前記コア3との間に個々に配置した従来（図2参照）とほぼ同等のシール機能を果たしている。

【００１３】前記電磁式燃料噴射弁によれば、Ｏリング１の内外のシール面がいずれも合成樹脂に比べて熱膨張による変形量が小さい金属製部品であるボデー２あるいはコア３と当接するため、高温雰囲気中で使用してもＯリング１の燃料シール性が損なわれにくい。

【００１４】

【発明の効果】本発明によれば、Ｏリングの内外のシール面がいずれも合成樹脂に比べて熱膨張による変形量の小さい金属製ボデー及びコアと当接していることにより、高温雰囲気中で使用することによるＯリングの燃料シール性の悪化を防止あるいは低減することができる。また、従来２個必要であったＯリングが１個でそれと同等のシール機能が得られるので、小型軽量化及び低コスト化を図ることができる。

【図面の簡単な説明】

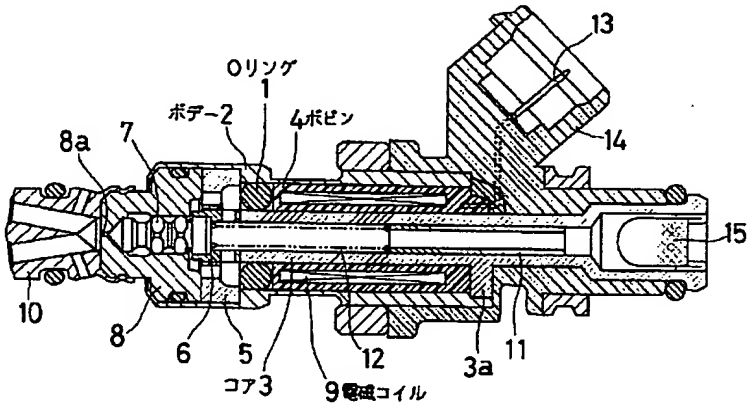
【図１】実施例の電磁式燃料噴射弁を示す断面図である。

【図２】従来例を示す断面図である。

【符号の説明】

1　Ｏリング
2　ボデー
3　コア
4　ボビン
9　電磁コイル

【図１】



【図２】